

CSC 400 Estimation Questions

September 3, 2010

Document your sources and describe your reasoning and assumptions in answering the following questions. For uncertain quantities, it is wise to consult more than one source. Do your own calculation rather than looking up the answers (which might very well be wrong).

1. Estimate the total mass of insects consumed in a year in Monroe county by yellow-jacket wasps (The U of R mascot). Many of the prey insects are pests of agricultural and horticultural plants, so yellow-jackets are, by and large, considered beneficial to human endeavors.
2. How many tons of disposable plastic grocery bags are used in the US each year? How much is this per person? How many kilocalories (nutritional calorie unit) of energy per person per day would this plastic produce if burned? How many tons of gasoline and diesel are used in the US each year? Would eliminating plastic bags save a significant amount of petroleum (relative to the amount we burn)?
3. What is the current value of the New York City metro area real estate that would be flooded (at ground level) by a 10 foot rise in sea level? How much would it cost to protect this real estate by building levees, dikes, and seawalls?
4. How many megawatts of electric power does the US currently consume? (averaged over a year). Estimate the capital cost of building enough solar-electric capacity to supply this. How does this cost compare to the US GDP?
5. Estimate the cost of building a TGV-style high-speed rail link from Albany to Buffalo more or less along the route of the old Erie canal, and linking at least Buffalo, Rochester, Syracuse, Utica, and Albany. Estimate annual ridership in passenger miles. Assuming a 20 year payoff of the capital cost, what is the construction cost per passenger mile? Estimate the operation expense per passenger mile. How does the total compare with automobile transportation?